JOB SHEET 55

Testing the Charging System Output

Name: _____ Station: _____ Date: _____

NATEF Correlation

This Job Sheet addresses the following NATEF task(s):

6.D.1 Perform charging system output test; determine necessary action. (P-1)

6.D.2 Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions. (P-1)

Performance Objective(s)

Upon completion of this Job Sheet, you will be able to understand how to properly test the alternator for its output and determine if it is the cause of the charging system problem.

Tools and Materials

Service manual
Technician's tool set
Vehicle
Charging system tester

Protective Clothing/Equipment

Goggles or safety glasses with side shields

Describe the vehicle being worked on:

Year	Make	Model	VIN	Engine type and size

PROCEDURE

1. Identify the manufacturer and model of the alternator you are working on.

   _____

2. Using the service manual, locate the alternator electrical specifications.

   Voltage output _____ volts

   Amperage output _____ amps

   Rated at _____ engine rpm

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3. Using Job Sheet #46, test the battery. You will need a good battery to perform a charging system test.

   Warning: *Never attempt to remove the battery cables while the engine is running!*

   Task Completed _____

4. If the battery cables were removed with the engine running, what could happen?

   _____

   _____

5. Connect the charging system tester to the vehicle.

   Task Completed _____

6. Start the engine and run it at the specified engine speed.

   Note: *Most manufacturers specify the maximum output availability of the alternator. In order to obtain this you may need to turn on all of the accessories (do not turn on the wipers or turn signals).*

   Task Completed _____

7. Observe the charging system tester. Record the meter's readings here.

   Voltage output _____ volts

   Amperage output _____ amps

   Rated at _____ engine rpm

8. Based on your test results, is there anything wrong with the alternator?

   _____

9. Explain what could cause the alternator to undercharge the battery and how the test results would reflect that.

   _____

   _____

10. Explain what could cause the alternator to overcharge the battery and how the test results would reflect that.

    _____

    _____

Problems Encountered

_____

_____

_____

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INSTRUCTOR EVALUATION

- ☐ 4 Mastered Task
- ☐ 3 Able to Perform Task Independently; Some Additional Training Suggested
- ☐ 2 Able to Perform Task with Close Supervision; Requires Additional Training
- ☐ 1 Unable to Perform Task
- ☐ 0 Not Attempted

Comments

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_____

Instructor Name: _____ Date: _____

Instructor Signature: _____

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JOB SHEET 56

Performing a Charging System Voltage Test

Name: _____ Station: _____ Date: _____

NATEF Correlation

This Job Sheet addresses the following NATEF task(s):

6.D.5 Perform charging circuit voltage drop tests; determine necessary action. (P-1)

Performance Objective(s)

Upon completion of this Job Sheet, you will be able to understand how to properly test the charging system circuit for voltage, voltage drop, and voltage regulation.

Tools and Materials

Service manual
Technician's tool set
Vehicle
DMM with alligator clips

Protective Clothing/Equipment

Goggles or safety glasses with side shields

Describe the vehicle being worked on:

Year	Make	Model	VIN	Engine type and size

PROCEDURE

1. Describe how the charging system in the vehicle you are working on regulates its voltage. Include whether or not a computer module is involved.

_____

_____

_____

2. Using Job Sheet #46, test the battery. You will need a good battery to perform a charging system test.

Warning: *Never attempt to remove the battery cables while the engine is running!*

Task Completed _____

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3. Perform a visual inspection of the charging system connectors and wires on the back side of the alternator. Are they corroded, broken, missing, etc.?

_____

4. Obtain the wiring diagram for the charging system you are working on.

Task Completed _____

5. Using the wiring diagram, identify the output, input, and ground wires for the alternator. Describe the color and location of these wires by drawing them in the space below.

6. Is the charging system you are working on controlled by pulse width modulation?

_____

Note: *If your vehicle is controlled by pulse width modulation, add step 16.*

7. Connect the voltmeter negative test lead alligator clips to the battery positive terminal and the positive test lead alligator clips to the output wire of the alternator.

Task Completed _____

8. Turn the engine on and turn the high-beam headlights on.

Task Completed _____

9. What is the voltage drop reading on the voltmeter?

_____

10. Is that reading excessive?

_____

11. Connect the voltmeter across the charging system's control wire, measure the voltage drop, and record your readings.

_____

12. Connect the voltmeter across the charging system's ground wire, measure the voltage drop, and record your readings.

_____

13. If any of your readings are outside of the specifications, refer to the service manual for the procedure to full-field test the alternator.

Task Completed _____

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14. Describe the manufacturer's procedure for full-field testing the alternator.

_____

_____

15. Explain what a full-field alternator test is.

_____

_____

16. For pulse modulated vehicles, set your DMM to read duty cycle and place the DMM positive lead on the charging system control wire and the negative lead on ground. Compare your reading with that in the service manual.

_____

Problems Encountered

_____

_____

_____

INSTRUCTOR EVALUATION

- ☐ 4 Mastered Task
- ☐ 3 Able to Perform Task Independently; Some Additional Training Suggested
- ☐ 2 Able to Perform Task with Close Supervision; Requires Additional Training
- ☐ 1 Unable to Perform Task
- ☐ 0 Not Attempted

Comments

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Instructor Name: _____ Date: _____

Instructor Signature: _____

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JOB SHEET 57

Remove and Reinstall an Alternator

Name: _____ Station: _____ Date: _____

NATEF Correlation

This Job Sheet addresses the following NATEF task(s):

6.D.3 Inspect, adjust, or replace generator (alternator) drive belts, pulleys, and tensioners; check pulley and belt alignment. (P-1)

6.D.4 Remove, inspect, and install generator (alternator). (P-1)

Performance Objective(s)

Upon completion of this Job Sheet, you will be able to understand how to properly test the charging system circuit for voltage, voltage drop, and voltage regulation.

Tools and Materials

Service manual
Technician's tool set
Vehicle
Hoist
Serpentine belt removal tool

Protective Clothing/Equipment

Goggles or safety glasses with side shields

Describe the vehicle being worked on:

Year	Make	Model	VIN	Engine type and size

PROCEDURE

1. Describe where the alternator is located.

_____

_____

2. Describe how the alternator (or serpentine) belt is tensioned.

_____

_____

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3. Locate the service procedures for alternator removal in the service manual.

Task Completed _____

4. Following the manufacturer's service procedures, release the tension from the belt and remove it.

Task Completed _____

5. Inspect the belt and the tensioner. Replace if needed.

Task Completed _____

6. Do you need to use the hoist to remove the alternator?

_____

7. What other components need to be removed before removing the alternator?

_____

8. Disconnect the negative battery cable.

Task Completed _____

9. Disconnect the positive battery cable.

Task Completed _____

10. After removing the battery cables, describe the procedure you must use to remove the alternator.

_____

_____

11. After removing the alternator, inspect it for cracks and damage. Spin the pulley to check the bearing.

Task Completed _____

12. Replace the alternator using the reverse procedure of removal.

Task Completed _____

13. Reinstall the belt and tension it to specifications.

Task Completed _____

14. Explain how an undertensioned belt may cause undercharging.

_____

_____

_____

15. Using Job Sheet #55, test the charging system's output to ensure that everything was put back together correctly.

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Problems Encountered

_____

_____

_____

INSTRUCTOR EVALUATION

- ☐ 4 Mastered Task
- ☐ 3 Able to Perform Task Independently; Some Additional Training Suggested
- ☐ 2 Able to Perform Task with Close Supervision; Requires Additional Training
- ☐ 1 Unable to Perform Task
- ☐ 0 Not Attempted

Comments

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Instructor Name: _____ Date: _____

Instructor Signature: _____

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